GOVERNMENT OF INDIA
ATOMIC ENERGY
LOK SABHA

UNSTARRED QUESTION NO:183
ANSWERED ON:16.11.2016
Thorium Deposits
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Will the Minister of ATOMIC ENERGY be pleased to state:

(a)the quantum of Thorium deposits in the country and which are the sites and States which possess thorium along with quantity;

(b)whether Uranium used in nuclear power stations today provides around 14% of the total electricity produced world wide and this is increasingly being used by countries for producing electricity and if so, the details thereof;

(c)whether the Government is also planning to tap this resource for power generation in India which can be used in nuclear reactors;

(d)if so, the steps taken for the same and the funds allocated for research into this area for last three years; and

(e)whether the Government has consulted with any other country or scientific expert body outside India for expert research guidance and technology transfer for utilising in this process and if so, the details thereof?

Answer

THE MINISTER OF STATE FOR, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PRIME MINISTER''S OFFICE (DR. JITENDRA SINGH):

(a)The Atomic Minerals Directorate for Exploration & Research (AMD), a constituent unit of Department of Atomic Energy (DAE), has so far established 11.935 million tonnes (Mt) of monazite in the country, which contains about 1.07 million tonnes (Mt.) of thorium. The state-wise resources of in situ monazite established by AMD as on October 2016 are as follows:

State	No. of deposits	Resource (Mt)
Odisha	10	2.41
Andhra Pradesh	26	3.72
Tamil Nadu	51	2.46
Kerala	35	1.90
West Bengal	1	1.22
Jharkhand	1	0.22
Maharashtra	3	0.002
Gujarat	1	0.003
Total	128	11.935

(b)Yes, Sir. According to World Nuclear Association, an international organization that represents the global nuclear industry, uranium used in 447 commercial nuclear power reactors in 31 countries, with a total installed capacity of over 390,000 MWe, supplies almost 11.5% of global electricity (as on August, 2016). In fact, through regional transmission grids, many more than those countries depend on nuclear-generated power. About 60 further nuclear power reactors are under construction, equivalent to 16% of existing capacity, while over 160 are firmly planned, equivalent to nearly half of present capacity.

(c)Yes, Sir. At present, total of 21 numbers of uranium fuel based commercial reactors having a total electricity generation capacity of 5780 MWe are currently operating in the country. Several more reactors are under construction and planning.

The Government is also planning to tap the thorium resource for power generation in India. The Department of Atomic Energy (DAE) is making all efforts towards technology development for utilisation of thorium fuel cycle. Research & Development (R&D) on thorium utilisation continues to be a high priority area of DAE.

India has large deposits of thorium, which can be used to generate nuclear power. However, it is not possible to build a nuclear reactor using thorium alone due to its physics characteristics. Thorium has to be converted to Uranium-233 in a reactor before it can be used as fuel. With this in view, a three-stage nuclear power programme, based on a closed nuclear fuel cycle has been chalked out to use thorium as a viable and sustainable option, right at the inception of India's nuclear power programme. The three stage nuclear power programme aims to multiply the domestically available fissile resource through the use of natural uranium in Pressurised Heavy Water Reactors, followed by use of plutonium obtained from the spent fuel of Pressurised Heavy Water Reactors in Fast Breeder Reactors. Large scale use of Thorium will subsequently follow making use of Uranium-233 that will be bred in Fast Breeder Reactors, when adequate nuclear installed capacity in the country has been built. The third stage of Indian nuclear power programme which contemplates making use of Uranium-233 to fuel Uranium-233 − Thorium based reactors, can provide energy independence to the country for several centuries. All efforts towards technology development and demonstration are being made now, so that a mature technology is available in time.

DAE has therefore planned the use of thorium as a sustainable and long-term option in the third stage of the Indian nuclear programme. The utilisation of Thorium, on a significant scale, can begin only when abundant supplies of either Uranium or Plutonium resources are available. Accordingly, the large scale introduction and utilization of Thorium in the programme has been contemplated towards later part of the second stage which will be after a few decades of large scale deployment of FBRs.

(d) As part of the recent plan projects, a total of `292 crore has been allotted for development programme on thorium based reactors.

XII-C-R&D-82 (ANRD) − Rs.86 Crore

XII-N-R&D-43 (SATDAR) − Rs.116 Crore

MTA − Infrastructure and Component Development for launching AHWR − XII plan project in Power Sector − Rs.90 Crore

(e)Other countries or scientific bodies have not been consulted by the Department for expert research guidance and technology transfer for the development of thorium based nuclear reactors.

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